

B. Claim Listing

The following claim listing replaces all prior versions and claim listings in the application.

1. (Currently Amended) A color measurement instrument comprising:

illuminator means for illuminating a sample, wherein said illuminator means ~~is mounted to a first substrate and~~ defines an axis of illumination;

color measurement means for measuring light reflected from said sample, wherein said color measurement means ~~is mounted to a second substrate and~~ defines an axis of detection, ~~wherein the second substrate is physically separated from the first substrate, and~~ wherein the axis of detection intersects the axis of illumination to form a non-zero angle;

a temperature changing element for changing a temperature of said illuminator means;

temperature sensing means for sensing the temperature of said illuminator means; and

control means responsive to said temperature sensing means for controlling said temperature changing element such that the temperature of said illuminator means is maintained substantially equal to a target temperature that is greater than an ~~ambient operating temperature~~ operational ambient temperature range of the instrument.

2. (Original) A color measurement instrument as defined in claim 1 wherein said illuminator means includes a light emitting diode (LED).

3. (Original) A color measurement instrument as defined in claim 1 wherein said illuminator means includes an illuminator and a thermally conductive base supporting said illuminator.
4. (Previously Presented) A color measurement instrument as defined in claim 3 wherein said temperature changing element and said temperature sensing means are mounted on said base.
5. (Currently Amended) A color measurement instrument comprising:
- an illuminator, ~~wherein said illuminator is mounted to a first substrate and defines~~
defining an axis of illumination;
- a color measurement engine, ~~wherein said color measurement engine is mounted to a second substrate and defines~~ defining an axis of detection, ~~wherein the second substrate is physically separated from the first substrate, and wherein the axis of detection intersects the axis of illumination to form a non-zero angle; and~~
- control means for controlling a temperature of said illuminator such that the temperature is maintained substantially equal to a target temperature that is greater than an ~~ambient operating temperature~~ operational ambient temperature range of the instrument, wherein said control means includes:
- a temperature sensing element thermally connected to said illuminator;
- and
- a temperature changing element thermally connected to said illuminator.

6. (Original) A color measurement instrument as defined in claim 5 wherein said illuminator includes a light emitting diode (LED).

7. (Previously Presented) A color measurement instrument as defined in claim 5 wherein said illuminator further includes a thermally conductive base, said control means coupled to said base.

8. (Previously Presented) A color measurement instrument as defined in claim 7 wherein:

said temperature sensing element is supported by said base; and

said temperature changing element is supported by said base.

9. (Currently Amended) A method of measuring color comprising the steps of:

illuminating a sample with at least one illuminator in thermal communication with a thermally conductive base, wherein the at least one illuminator defines an axis of illumination;

measuring light reflected from the sample with a color measurement circuit, wherein the color measurement circuit ~~is mounted to a substrate and~~ defines an axis of detection, ~~wherein the substrate is physically separated from the base, and wherein the axis of detection~~ which intersects the axis of illumination to form a non-zero angle; and

controlling a heating element in thermal communication with the base such that a temperature of the at least one illuminator is maintained substantially equal to a target temperature that is greater than an ~~ambient operating temperature~~ operational ambient

temperature range of the instrument to enhance the uniformity of at least one output characteristic.

10. (Original) A method as defined in claim 9 wherein:

the at least one illuminator comprises a light emitting diode (LED); and

the at least one output characteristic includes intensity, spectral energy distribution, and spatial distribution of the light from the LED.

11. (Previously Presented) A method as defined in claim 9 wherein said controlling step includes:

measuring a temperature of the base;

comparing the temperature of the base with the target temperature; and

controlling the heating element based on said comparing step.

12-20. (Canceled)

21. (Currently Amended) A color measurement instrument, comprising:

a substrate;

a temperature sensor in thermal communication with ~~an illuminator~~ the substrate;

a heating element in thermal communication with the ~~illuminator~~ substrate;

a temperature-sensitive illuminator in thermal communication with the ~~illuminator~~ substrate;

a temperature controller coupled to the temperature sensor and the heating element to maintain a temperature of the illuminator substantially equal to a target temperature that is greater than an operational ambient temperature range of the instrument; and

a light-sensing device ~~mounted to a sensor substrate~~.

22. (Previously Presented) The color measurement instrument of claim 21, wherein the temperature sensor is a thermistor.

23. (Previously Presented) The color measurement instrument of claim 21, wherein the heating element is a resistor.

24. (Previously Presented) The color measurement instrument of claim 21, wherein the temperature-sensitive illuminator is a light emitting diode.

25. (Previously Presented) The color measurement instrument of claim 21, wherein the light-sensing device is a photodiode.